

# MERRA Regrid Introduction

Comparing data sets

# Comparing Analyses

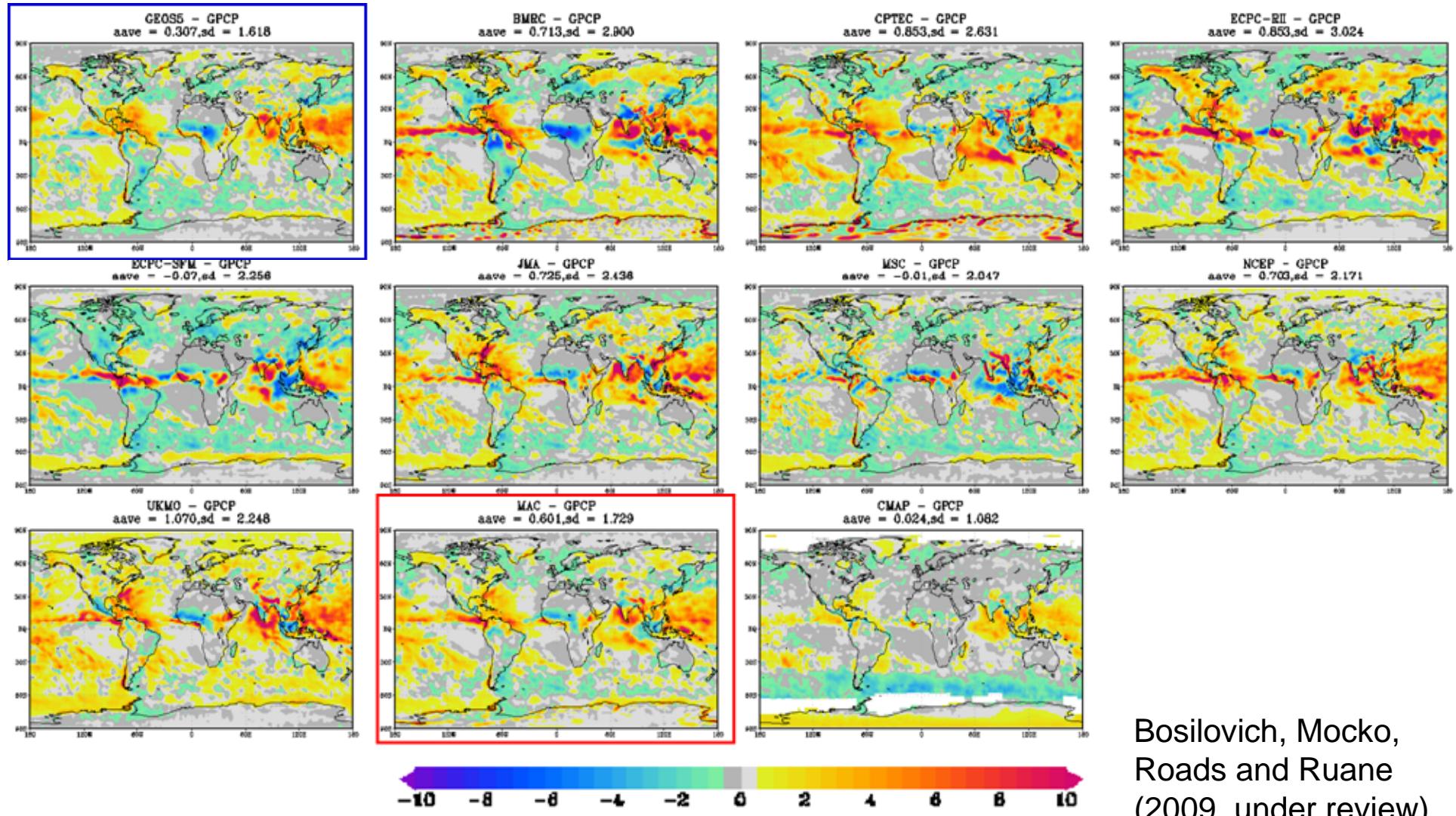
- Multi-model Analysis for CEOP
  - Regridded several analyses to a common spatio-temporal structure (6hrly over 2yrs)
  - Resolution, missing data, forecast or analysis, valid times, variable names (units), grib format
- Provides a reference ensemble mean, and variance (all analyses are not created equal!)
- Comparing one analysis to one other can be misleading

# Variable Timing

<b>Description</b>	<b>Units</b>	<b>BMRC</b>	<b>Centers</b>						
			<b>CPTEC</b>	<b>ECP CRII</b>	<b>ECP CSFM</b>	<b>JMA</b>	<b>MSC</b>	<b>NCEP</b>	<b>UKMO</b>
Surface Pressure	Pa	analysis	12hr fcst+	6hr fest	6hr fest	analysis	anl/6hr fcst+	6hr fest	analysis
Mean Sea Level Pressure	Pa	analysis		analysis	analysis				analysis
Surface Air Temperature	K	analysis	12hr fcst+	6hr fest	6hr fest	analysis	anl/6hr fcst+	6hr fest	analysis
Surface Skin Temperature	K	analysis	12hr fcst+	6hr fest	6hr fest		anl/6hr fcst+	6hr fest	analysis
Surface Air Moisture	kg kg <sup>-1</sup>	analysis	12hr fcst+	6hr fest	6hr fest	analysis	anl/6hr fcst+	6hr fest	analysis
Surface Eastward Wind	m s <sup>-1</sup>	analysis	12hr fcst+	6hr fest	6hr fest	analysis	anl/6hr fcst+	6hr fest	analysis
Surface Northward Wind	m s <sup>-1</sup>	analysis	12hr fcst+		6hr fest	analysis	anl/6hr fcst+	6hr fest	analysis
Precipitation	kg m <sup>-2</sup> s <sup>-1</sup>	analysis	12hr fcst+	0-6hr ave	0-6hr ave	6hr fest	3hr fest+	0-6hr ave	0-6hr acc
Convective Precipitation	kg m <sup>-2</sup> s <sup>-1</sup>			0-6hr ave	0-6hr ave				0-6hr acc
Surface Runoff	kg m <sup>-2</sup>		12hr fcst+	0-6hr ave	0-6hr ave			3hr fest+	0-6hr acc
Liquid equivalent snow depth	kg m <sup>-2</sup>	analysis			6hr fest	6hr fest		anl/6hr fcst+	6hr fest
Latent Heat Flux	W m <sup>-2</sup>	analysis	12hr fcst+	0-6hr ave	0-6hr ave	0-6hr ave	3hr fest+	0-6hr ave	0-6hr ave
Sensible Heat Flux	W m <sup>-2</sup>	analysis	12hr fcst+	0-6hr ave	0-6hr ave	0-6hr ave	3hr fest+	0-6hr ave	0-6hr ave
Surface Incoming Shortwave	W m <sup>-2</sup>	analysis	12hr fcst+	0-6hr ave	0-6hr ave	0-6hr ave	3hr fest+	0-6hr ave	0-6hr ave
Surface Incoming Longwave	W m <sup>-2</sup>	analysis	12hr fcst+	0-6hr ave	0-6hr ave	0-6hr ave	3hr fest+	0-6hr ave	0-6hr ave
Surface Reflected Shortwave	W m <sup>-2</sup>	analysis	12hr fcst+	0-6hr ave	0-6hr ave	0-6hr ave	3hr fest+	0-6hr ave	0-6hr ave
Surface Outgoing Longwave	W m <sup>-2</sup>	analysis	12hr fcst+	0-6hr ave	0-6hr ave	0-6hr ave	3hr fest+	0-6hr ave	0-6hr ave
TOA Longwave Outgoing	W m <sup>-2</sup>		12hr fcst+	0-6hr ave	0-6hr ave	0-6hr ave	3hr fest+	0-6hr ave	0-6hr ave
TOA Shortwave Incoming	W m <sup>-2</sup>			0-6hr ave	0-6hr ave	0-6hr ave	3hr fest+		0-6hr ave
TOA Shortwave Outgoing	W m <sup>-2</sup>		12hr fcst+	0-6hr ave	0-6hr ave	0-6hr ave	3hr fest+	0-6hr ave	0-6hr ave
Total Cloud Cover	(0-1)		12hr fcst+	0-1hr ave	0-1hr ave	analysis	anl/6hr fcst+	0-6hr ave	analysis
Total Column Water Vapor	kg m <sup>-2</sup>	analysis	12hr fest+	6hr fest	6hr fest		anl/6hr fcst+	6hr fest	
Total Column Condensed Water	kg m <sup>-2</sup>					analysis	anl/6hr fcst+	6hr fest	
Q850	kg kg <sup>-1</sup>	analysis	12hr fest+	analysis	analysis		anl/12hr fcst	6hr fest	analysis
T850	K	analysis	12hr fest+	analysis	analysis	analysis	anl/12hr fcst	6hr fest	analysis
U850	m s <sup>-1</sup>	analysis	12hr fest+	analysis	analysis	analysis	anl/12hr fcst	6hr fest	analysis
V850	m s <sup>-1</sup>	analysis	12hr fest+	analysis	analysis	analysis	anl/12hr fcst	6hr fest	analysis
H850	m	analysis	12hr fest+	analysis	analysis	analysis	anl/12hr fcst	6hr fest	analysis
Q700	kg kg <sup>-1</sup>	analysis	12hr fest+	analysis	analysis		anl/12hr fcst	6hr fest	analysis
T700	K	analysis	12hr fest+	analysis	analysis	analysis	anl/12hr fcst	6hr fest	analysis
U700	m s <sup>-1</sup>	analysis	12hr fest+	analysis	analysis	analysis	anl/12hr fcst	6hr fest	analysis
V700	m s <sup>-1</sup>	analysis	12hr fest+	analysis	analysis	analysis	anl/12hr fcst	6hr fest	analysis

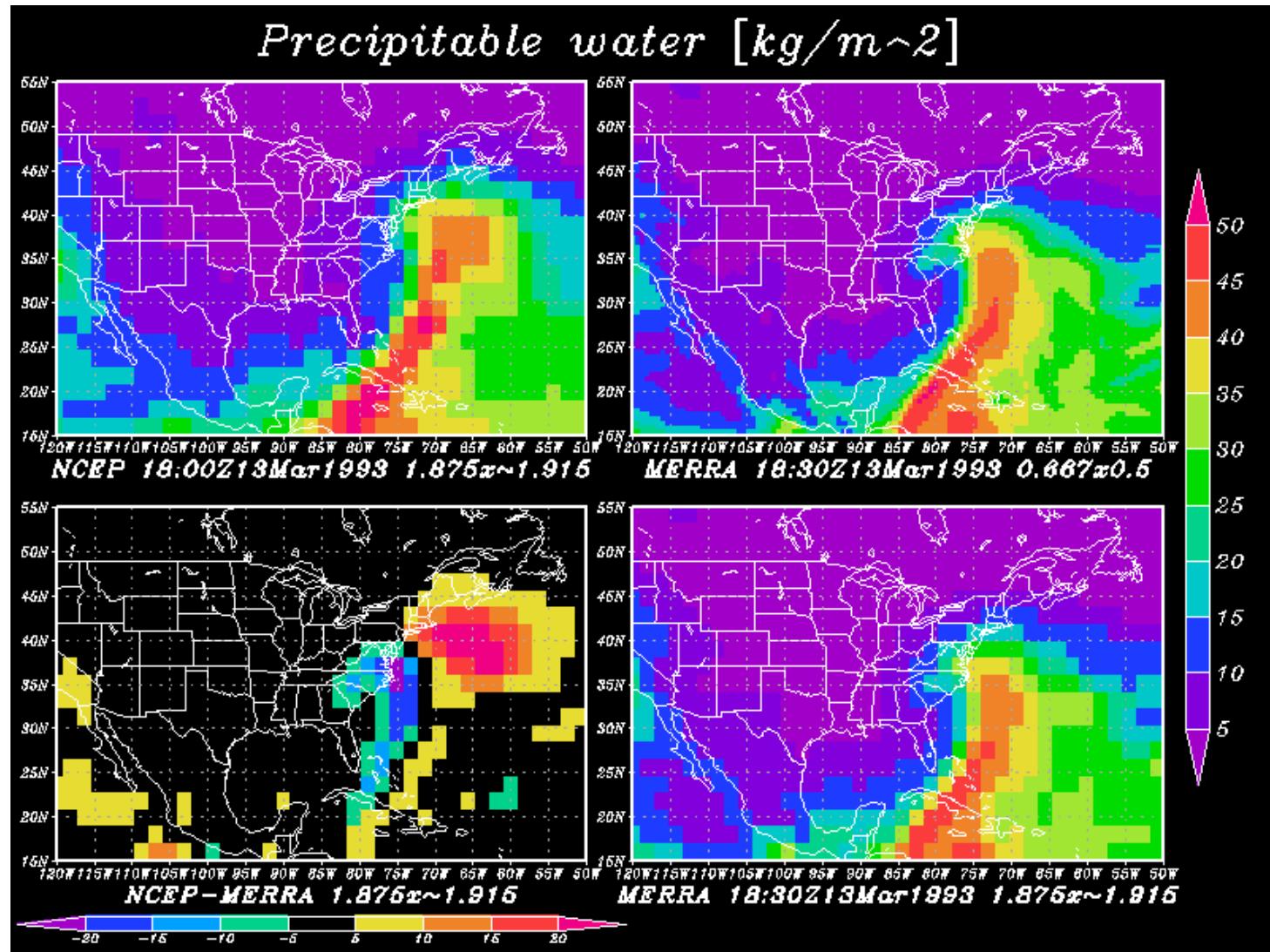
# Multi-model comparison

200407 Precipitation (mm/day)



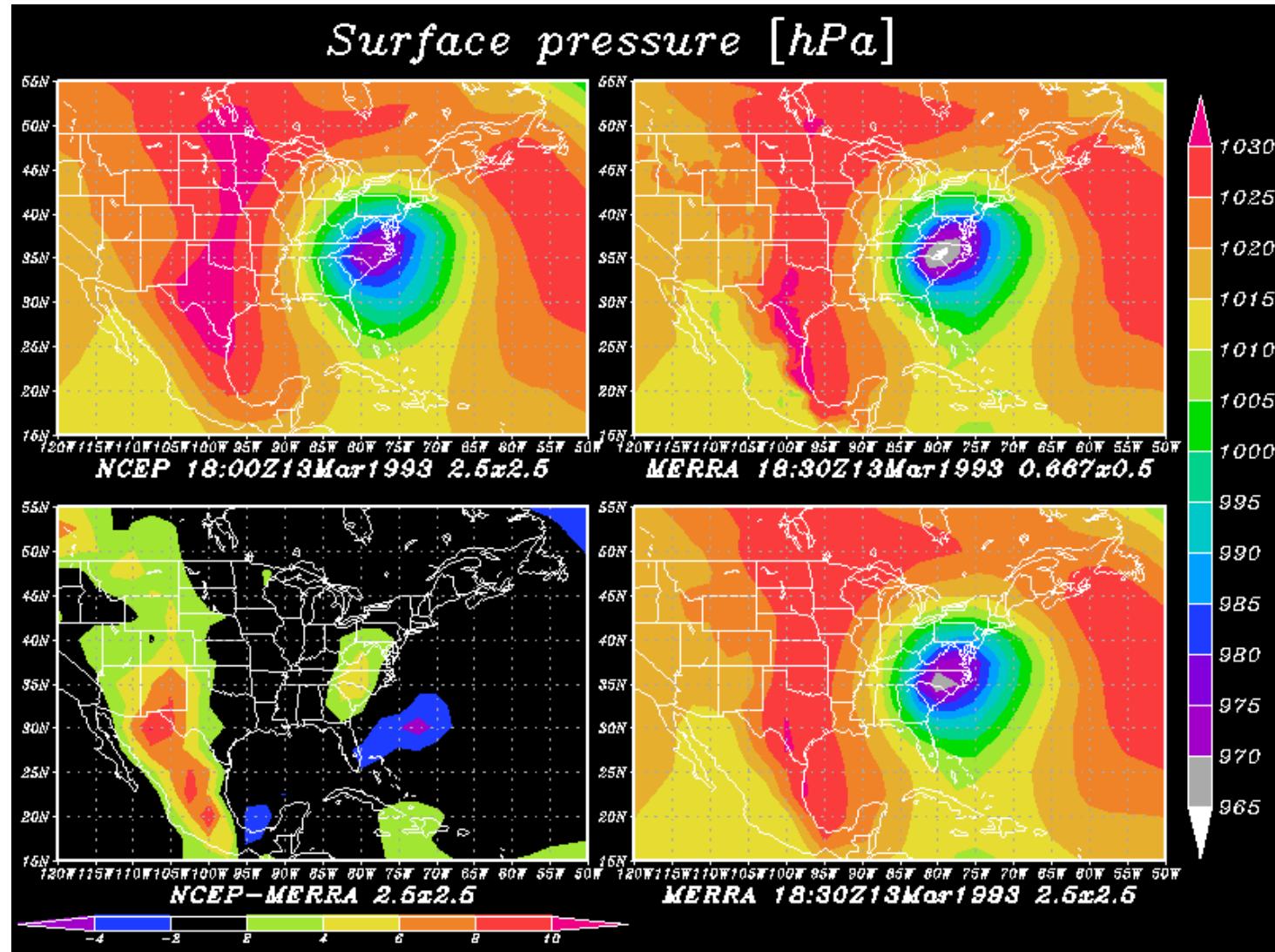
Bosilovich, Mocko,  
Roads and Ruane  
(2009, under review)

# NCEP Coarse grids



- Total column water, Note timing is an issue

# NCEP Coarse grids



- Sea level pressure from NCEP pgb, 2.5 reg grid

# Regrid Example

- Using GDS, compare the TPW and SLP from NCEP R2 to MERRA

```
'define merratpw=tqv.3(z=1,time=18:30Z13MAR1993)'  
'define  
    rgmerratpw=re(merratpw,192,linear,0.0,1.875,94,gaus,  
    1,94,ig,94,ba)'  
'define tpwdiff=nceptpw-rgmerratpw'
```

- Gaussian grid gotcha: regions can be difficult
- Calculations were done for the globe then plotted for the region

# Look-Alike: Lats4d to create local data files

- Lats4d: command line utility, subsets vars, time, space, but also reads/writes many formats, and implements functions (mean and regrid, for example)
- /GrADS20/merra/LookAlike

```
lats4d -i MERRA200.tavg1_2d_slv_Nx.xdf -  
ftype xdf -o MERRA200.tavg1_2d_slv_NR2 -  
format grads_grib -func  
"re(@,192,linear,0.0,1.875,94,gaus,1,94,ig  
,94,ba)" -vars slp ps t2m -de reanalysis-  
2/6hr/flx/flx.ft06.199208.ctl
```